Apparatus for laying at least one cable, in particular in a component of a vehicle, sun visor with an apparatus for laying purposes, and method for laying a cable

The present invention relates to an apparatus, in particular for a component of a vehicle, for example a sun visor, for laying at least one cable.

Expenditure on cabling in vehicles is very high on account of the wide variety of equipment in vehicles. For example, vehicles are often fitted with comfort components with which the journey can be made as comfortable as possible both for the driver and also for passengers. Many equipment components require an electrical connection, and this is complicated in terms of production, often has to be carried out manually on account of the restricted amount of space, and is therefore expensive.

On account of the small amount of space available in vehicles, this space should be utilized in an optimum manner.

The object of the present invention is therefore to provide a cost-effective apparatus for cabling components, in particular for a vehicle, which is simple to produce, easy to mount, saves space and with which it is possible to lay the cables in a simple and largely automated manner.

The object is achieved by an apparatus, in particular for a component of a vehicle, for laying at least one cable, wherein the apparatus comprises a guide means, and wherein the cable can be moved to a contact-making means by means of the guide means. The guide means makes it easier to lay the cable to the contact-making

means, so that the cable can be laid in a quick, simple and therefore cost-effective manner.

The apparatus preferably comprises a transfer means which is particularly preferably substantially in the form of a funnel. The cable is passed to the guide means through the transfer means. The funnel shape firstly means that the cable can be inserted very easily into the transfer means and secondly positioned very precisely on the guide means.

In one preferred embodiment of the invention, the apparatus comprises the contact-making means, so that it is possible to install the apparatus into the components as one assembly. The apparatus can therefore be mounted in a very quick and cost-effective manner.

The transfer means preferably has an inlet opening and an outlet opening, wherein the cable can be laid from the inlet opening to the outlet opening, and wherein the cross section of the outlet opening in the laying direction of the cable is approximately the same size as or slightly larger than the sum of the cross sections of all of the cables which are passed through the transfer means. The cables therefore rest substantially against one another at the outlet opening which is large enough to allow all of the cables to easily pass through it.

The cross section of the inlet opening in the laying direction of the cable is preferably at least twice the size of the cross section of the outlet opening, so that the cable can be easily inserted at the inlet opening of the transfer means.

In one preferred embodiment, a plurality of cables are provided next to one another at the outlet opening, particularly preferably substantially in one plane, so

that they can enter the guide means individually and there be passed to the contact-making means individually.

The transfer means is preferably made of plastic. A person skilled in the art knows that any material which is light and easily deformable is suitable.

In one preferred embodiment, the guide means has at least one substantially elongate cable guide with at least one substantially L-shaped surface profile and/or at least one substantially U-shaped surface profile transverse to the laying direction of the cable, on which surface profile the cable rests. This ensures that the cable is passed in or along the cable guide without slipping away, and that it is particularly not passed to locations at which the contact-making means can no longer make effective contact with it.

The guide means preferably has precisely one cable guide for each cable, with a plurality of cable guides being arranged next to one another in particular, so that each cable is passed to the contact-making means individually and the cables do not become entangled with one another.

The guide means preferably has a ramp for deflecting a plurality of cables from an inlet plane, in which the cables enter the guide means, into an outlet plane, in which the cables leave the guide means. The cables are preferably stiff, so that they at least substantially maintain their laying direction when they leave the guide means. The cables are therefore preferably deflected such that they can be positioned advantageously on and/or in the contact-making means, for example above the contact-making means. In order for the contact-making means to make contact with the cables, said cables are at least partially bent back in

the direction of the inlet plane of the cables into the guide means on that side of the guide means on which they leave said guide means. Therefore, when subjected to a tensile load which acts on at least one of the cables in the direction opposite the laying direction, the cable is supported at an edge or at a support point which is located at the outer corner of the ramp on the guide means in the outlet plane of the cable. The guide means therefore assumes the function of a strain-relief means for the cables.

The plurality of cables are preferably present at the outlet opening of the transfer means in the inlet plane of the guide means, so that the cables can slide from the transfer means into the guide means without being left hanging.

In the laying direction of the cables, the cable guides are preferably at least partly bent such that adjacent cables are parallel to one another and rest substantially against one another in the inlet plane, whereas they are spaced apart from one another in the outlet plane. This creates the distance between the cables which is required at the contact-making means.

The contact-making means is preferably a pressure-connection terminal, in particular an insulation-displacement terminal. The use of a pressure-connection terminal means that the cable can be connected quickly and easily. Expenditure on stripping before contact is made can be saved by using an insulation-displacement terminal. A person skilled in the art knows that any contact-making means which secure the position of the cable and which can be used to reliably contact-connect the cable to the electronic/electrical system can be used, for example even screw terminals. A person skilled in the art also knows that contact-making means with which expenditure on stripping the cable can be

saved are preferably used. This also has the advantage that the cables (not stripped) can be laid more effectively, in particular in the transfer means and/or in the guide means.

In one preferred embodiment, the apparatus is produced integrally, so that expenditure on mounting a plurality of components of the apparatus is dispensed with. The apparatus can therefore be used in a particularly cost-effective manner in this embodiment.

The inventive apparatus for laying at least one cable makes it possible to lay cables in or for components, in particular in vehicles, in a simple, quick and cost-effective manner. The apparatus can be produced in a cost-effective and simple manner and can be mounted easily.

The present invention also relates to a sun visor, in particular for a vehicle, which has an inventive apparatus for laying at least one cable. This means it is possible to connect cables in the sun visor in a simple, quick and cost-effective manner.

The present invention also relates to a method for laying a cable, in particular for connecting components of vehicles, having an apparatus according to the invention, wherein the cable is laid to the contact-making means by means of the apparatus and contact is then made between the cable and the contact-making means. This means it is possible to lay the cable simply and quickly.

The cable is preferably laid to the contact-making means by machine. In this case, the cable is pushed through the transfer means to the guide means and along the guide means to the contact-making means, and there positioned such that it is easy to make contact with

said cable. This means that working time can be saved, as a result of which the production costs are reduced.

The contact-making means is preferably at least one pressure-connection terminal, in particular an insulation-displacement terminal, wherein the cable is laid up to a point above the pressure-connection terminal, wherein the cable is pressed into the pressure-connection terminal by means of the force which acts on the cable, and wherein contact is made with the cable in the process. This is can be achieved easily and quickly and, in particular, also by machine.

The method according to the invention makes it possible to lay cables, in particular in or for connecting components of vehicles, in a simple and quick manner and largely by machine. Said method can also be carried out in a cost-effective manner.

The invention is described below with reference to **figures 1-4**. The descriptions are merely exemplary and do not restrict the general concept of the invention.

Figure 1 shows one embodiment of the apparatus according to the invention.

Figure 2 shows one embodiment of a guide means according to the invention.

Figure 3 shows a side view of the guide means from **figure 2**.

Figure 4 shows a sun visor with an apparatus according to the invention.

Figure 1 illustrates one embodiment of the inventive apparatus for laying at least one cable 2. The apparatus is suitable for laying two or else more

cables 2. It has a, particularly plastic, transfer means 4 which is, in particular, substantially in the form of a funnel. The transfer means 4 has an inlet opening 5 which is larger than the outlet opening 6, with the two cables 2 leaving the outlet opening 6 such that they are arranged next to one another and in one plane. The plane in which the cables 2 leave the outlet opening 6 of the transfer means 4 is the same as an inlet plane (illustrated later in figure 2 and figure 3) in which they enter a guide means 7. The guide means 7 has a cable guide 8 for each of the two illustrated cables 2, along which cable guide the cables 2 are passed when they are being pushed through, and also a ramp 9 with which the cables 2 are deflected out of their inlet plane, in particular upward, so that they are positioned above the contact-making means 1. The contact-making means 1 used here is two insulation-displacement terminals 1, so that, after being pushed through, in each case one of the cables 2 is positioned above a respective one of the insulation-displacement terminals 1 and can be pressed into the latter. Contact is made with the cables 2 in the process. The terms contact-making means 1 and insulation-displacement terminal 1 are used synonymously in the following text. Furthermore, an embodiment is also possible in which a plurality of cables 2, for example two cables 2, are deflected by the guide means 7 such that they leave the guide means 7 such that they are arranged one above the other, and are positioned above an insulation-displacement terminal 1 such that they are arranged one above the other. The cables 2 can then be pressed into the insulation-displacement terminal 1 together.

Figure 2 shows a guide means 7 for cables 2, in particular for two cables 2, which has two cable guides 8 and a ramp 9, so that the cables 2 enter the guide means 7 in the inlet plane 10 (which has already been

mentioned but not together with a reference symbol) and leave the guide means 7 in an outlet plane 11.

Figure 3 shows a side view of the guide means 7 from **figure 2** in order to illustrate the ramp 9. Said figure shows the profile of a cable 2 in the guide means 7. The cable 2 enters the guide means 7 in the inlet plane 10, is deflected by the ramp 9, and leaves the guide means 7 in the outlet plane 11. After leaving the guide means 7, said cable initially at least substantially maintains the direction of the outlet plane 11 in which it has been deflected by the guide means 7. When contact is made, in this case for example by pressing the cable 2 into the contact-making means 1 or into an insulation-displacement terminal 1, the cable 2 is bent back at least partially in the direction of the inlet plane 10 of the cable 2 into the guide means 7. As a result, a contact-connected cable 2' can be supported at a support point 12 when subjected to a tensile load in the direction opposite the laying direction 13, so that the ramp 9 of the guide means 7 acts as a strain-relief means for the cable 2. The support point 12 is particularly in the form of an edge.

Figure 4 illustrates a sun visor 3 as an example of a vehicle component which comprises the inventive apparatus for laying at least one cable 2. **Figure 4** shows the connection of cables 2 of the sun visor 3. The cables 2 are pushed through the transfer means 4, passed along the respective cable guide 8 of the guide means 7 over the contact-making means 1, here insulation-displacement terminals, and then pressed into the insulation-displacement terminals 1, where they are contact-connected.

The inventive apparatus and the inventive method can be used or employed in a large number of different components, in particular of vehicles, preferably

electrically connected components, for example in sun visors 3, in the cockpit or in vehicle doors.

List of reference symbols:

1	Contact-making means
2	Cable
2'	Cable after contact-connection
3	Sun visor
4	Transfer means
5	Inlet opening of the transfer means
6	Outlet opening of the transfer means
7	Guide means
8	Cable guide
9	Ramp
10	Inlet plane
11	Outlet plane
12	Support point of the cable after contact-connection
13	Laying direction